

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
6 May 2005 (06.05.2005)

PCT

(10) International Publication Number
WO 2005/041321 A1

(51) International Patent Classification⁷:

H01L 51/30

(21) International Application Number:

PCT/JP2004/015569

(22) International Filing Date: 14 October 2004 (14.10.2004)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2003-362510 22 October 2003 (22.10.2003) JP
2003-362511 22 October 2003 (22.10.2003) JP

(71) Applicant (for all designated States except US): **SEIKO EPSON CORPORATION [JP/JP]**; 4-1, Nishishinjuku 2-chome, Shinjuku-ku, Tokyo 163-0811 (JP).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SHINOHARA, Yuji** [JP/JP]; c/o Seiko Epson Corporation, 3-5, Owa 3-chome, Suwa-shi, Nagano 392-8502 (JP). **SHINOHARA, Takashi** [JP/JP]; c/o Seiko Epson Corporation, 3-5, Owa 3-chome, Suwa-shi, Nagano 392-8502 (JP).

(74) Agents: **ASAHI, Kazuo** et al.; Nishi-Shinbashi Noa Bldg., 4th Floor, 18-9, Nishi-Shinbashi 1-chome, Minato-ku, Tokyo 105-0003 (JP).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.



WO 2005/041321 A1

(54) Title: PURIFICATION OF HOLE TRANSPORTING MATERIAL BY MEANS OF ULTRAFILTRATION AND ION EX-
CHANGE CHROMATOGRAPHY

(57) Abstract: In an organic EL device, when a voltage is applied across an anode and a cathode, holes are moved in a hole transport layer and electrons are moved in an electron transport layer, and the holes and the electrons are recombined in a light emitting layer. In the light emitting layer, excitons are produced by energy released upon the recombination, and the excitons release energy in the form of fluorescence or phosphorescence or emit light when returning to the ground state. The hole transport layer is formed from a hole transport material, in which the amount of nonionic impurities having a molecular weight of 5,000 or less, or the amounts of anionic impurities, cationic impurities and nonionic impurities having a molecular weight of 5,000 or less is or are adjusted to be small, so that the decrease of light-emission luminance of the organic EL device is suppressed.